

VE Series

Features

- 3 ϕ ~ 18 ϕ , 85°C, 2,000 hours assured
- Chip type large capacitance capacitors
- Designed for surface mounting on high density PC board
- RoHS Compliance



Marking color: Black

Specifications

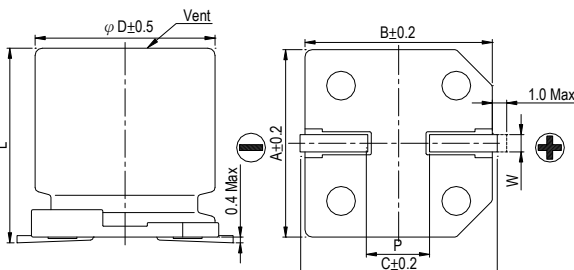
| Items | Performance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|----------------------|------|------|--------|------|------|------|------|-----------|-----------|---------------|-----------|-----|----|----|----|----|----|----|-----|-----------|-----------|---------------|------|------|------|------|------|------|------|------|------|---|---|------------------|---|------|------|------|------|------|------|------|------|------|------|
| Category Temperature Range | -40°C ~ +85°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (at 120Hz, 20°C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current (at 20°C) | Rated Voltage | 6.3 ~ 100V 160 ~ 450V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Time | after 2 minutes after 5 minutes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Case size | 3 ~ 10 ϕ 12.5 ~ 18 ϕ 12.5 ~ 18 ϕ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Leakage Current | I = 0.01CV or 3 μ A, whichever is greater I = 0.03CV or 4 μ A, whichever is greater I = 0.04CV + 100 μ A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Where, C = rated capacitance in μ F V = rated DC working voltage in V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tan δ (at 120Hz, 20°C) | <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160 ~ 250</th> <th>400 ~ 450</th> </tr> </thead> <tbody> <tr> <td>3 ~ 10 ϕ</td> <td>0.42</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.10</td> <td>0.10</td> <td>-</td> <td>-</td> </tr> <tr> <td>12.5 ~ 18 ϕ</td> <td>-</td> <td>0.38</td> <td>0.34</td> <td>0.30</td> <td>0.26</td> <td>0.22</td> <td>0.18</td> <td>0.14</td> <td>0.10</td> <td>0.20</td> <td>0.25</td> </tr> </tbody> </table> | | | | | | | | | | | | Rated Voltage | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 400 ~ 450 | 3 ~ 10 ϕ | 0.42 | 0.28 | 0.24 | 0.20 | 0.14 | 0.12 | 0.10 | 0.10 | 0.10 | - | - | 12.5 ~ 18 ϕ | - | 0.38 | 0.34 | 0.30 | 0.26 | 0.22 | 0.18 | 0.14 | 0.10 | 0.20 | 0.25 |
| | Rated Voltage | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 400 ~ 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 ~ 10 ϕ | 0.42 | 0.28 | 0.24 | 0.20 | 0.14 | 0.12 | 0.10 | 0.10 | 0.10 | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12.5 ~ 18 ϕ | - | 0.38 | 0.34 | 0.30 | 0.26 | 0.22 | 0.18 | 0.14 | 0.10 | 0.20 | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| When the capacitance exceeds 1,000 μ F, 0.02 shall be added every 1,000 μ F increase. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low Temperature Characteristics (at 120Hz) | Impedance ratio shall not exceed the values given in the table below. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Impedance Ratio | Rated Voltage | | 4.0 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 400 ~ 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Z(-25°C) | ϕ D < 12.5 | 7 | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | /Z(+20°C) | ϕ D \geq 12.5 | - | 5 | 5 | 4 | 2 | 2 | 2 | 2 | 2 | 3 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Z(-40°C) | ϕ D < 12.5 | 15 | 8 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| /Z(+20°C) | ϕ D \geq 12.5 | - | 14 | 12 | 10 | 5 | 4 | 3 | 3 | 3 | 6 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Endurance | Test Time | 2,000 Hrs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Capacitance Change | Within ±20% of initial value (4V: ±30%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Tan δ | Less than 200% of specified value (4V: ±300%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Leakage Current | Within specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * The above Specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 2,000 hours at 85°C. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shelf Life Test | Test time: 1,000 hours; other items are the same as those for the Endurance. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5101-4 4.1). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ripple Current & Frequency Multipliers | Freq. (Hz) | | 50 | 120 | 1k | 10k up | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Cap. (μ F) | | Under 1,000 | | 0.80 | 1.00 | 1.25 | 1.40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1,000 < C \leq 10,000 | | 0.85 | 1.00 | 1.15 | 1.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Diagram of Dimensions

Fig. 1



Fig. 2



Lead Spacing and Diameter

Unit: mm

| ϕ D | L | A | B | C | W | P ± 0.2 | Fig. No. |
|----------|------------|------|------|------|-------------|---------|----------|
| 3 | 5.3 ± 0.2 | 3.3 | 3.3 | 4.1 | 0.45 ~ 0.75 | 0.8 | 1 |
| 4 | 5.3 ± 0.2 | 4.3 | 4.3 | 5.1 | 0.5 ~ 0.8 | 1.0 | 1 |
| 5 | 5.3 ± 0.2 | 5.3 | 5.3 | 5.9 | 0.5 ~ 0.8 | 1.5 | 1 |
| 6.3 | 5.3 ± 0.2 | 6.6 | 6.6 | 7.2 | 0.5 ~ 0.8 | 2.0 | 1 |
| 6.3 | 7.7 ± 0.3 | 6.6 | 6.6 | 7.2 | 0.5 ~ 0.8 | 2.0 | 1 |
| 8 | 6.5 ± 0.3 | 8.4 | 8.4 | 9.0 | 0.5 ~ 0.8 | 2.3 | 1 |
| 8 | 10 ± 0.5 | 8.4 | 8.4 | 9.0 | 0.7 ~ 1.1 | 3.1 | 1 |
| 10 | 7.7 ± 0.3 | 10.4 | 10.4 | 11.0 | 0.7 ~ 1.3 | 4.7 | 1 |
| 10 | 10 ± 0.5 | 10.4 | 10.4 | 11.0 | 0.7 ~ 1.3 | 4.7 | 1 |
| 12.5 | 13.5 ± 0.5 | 13.0 | 13.0 | 13.7 | 1.1 ~ 1.4 | 4.4 | 2 |
| 12.5 | 16 ± 0.5 | 13.0 | 13.0 | 13.7 | 1.1 ~ 1.4 | 4.4 | 2 |
| 16 | 16.5 ± 0.5 | 17.0 | 17.0 | 18.0 | 1.1 ~ 1.4 | 6.4 | 2 |
| 16 | 21.5 ± 0.5 | 17.0 | 17.0 | 18.0 | 1.1 ~ 1.4 | 6.4 | 2 |
| 18 | 16.5 ± 0.5 | 19.0 | 19.0 | 20.0 | 1.1 ~ 1.4 | 6.4 | 2 |
| 18 | 21.5 ± 0.5 | 19.0 | 19.0 | 20.0 | 1.1 ~ 1.4 | 6.4 | 2 |

Marking

φ D = 3 mm



φ D = 4 ~ 6.3 mm



φ D = 8 ~ 10 mm



φ D ≥ 12.5 mm



Dimension: φ D × L(mm)

Ripple Current: mA/rms at 120 Hz, 85°C

Dimension & Permissible Ripple Current

| V. DC μF | Contents | 4V (0G) | | 6.3V (0J) | | 10V (1A) | | 16V (1C) | | 25V (1E) | | 35V (1V) | | 50V (1H) | | 63 (1J) | |
|-------------|----------|--------------------|-----------|--------------------|----------------|--------------------------|-------------------|-----------------------------|------------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|------------------|----------|
| | | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA |
| 1 | 010 | | | | | | | | | | | | | 4×5.3 | 10 | 4×5.3 | 8 |
| 2.2 | 2R2 | | | | | | | | | | | | | 4×5.3 | 14 | 4×5.3 | 12 |
| 3.3 | 3R3 | | | | | | | | | 3×5.3 | 14 | 3×5.3 | 14 | 4×5.3 | 17 | 5×5.3 | 22 |
| 4.7 | 4R7 | | | | | 3×5.3 | 14 | 3×5.3 | 14 | 4×5.3 | 26 | 4×5.3 | 26 | 4×5.3 | 20 | 5×5.3 | 25 |
| 10 | 100 | | | 3×5.3 | 16 | 4×5.3 | 26 | 4×5.3 | 26 | 5×5.3 | 44 | 5×5.3 | 44 | 5×5.3 | 35 | 6.3×5.3 8×6.5 | 40 46 |
| 22 | 220 | 3×5.3 | 16 | 4×5.3 | 26 | 5×5.3 | 44 | 4×5.3 5×5.3 | 30 44 | 5×5.3 6.3×5.3 | 47 59 | 5×5.3 6.3×5.3 | 47 59 | 6.3×5.3 6.3×7.7 | 50 65 | 8×10 | 139 |
| 33 | 330 | 4×5.3 | 31 | 4×5.3 | 31 | 4×5.3 5×5.3 | 31 55 | 5×5.3 | 55 | 5×5.3 6.3×5.3 | 55 67 | 6.3×5.3 6.3×7.7 | 67 85 | 6.3×7.7 8×6.5 | 75 95 | 8×10 | 139 |
| 47 | 470 | 4×5.3 | 34 | 4×5.3 5×5.3 | 34 55 | 6.3×5.3 | 75 | 5×5.3 6.3×5.3 | 55 75 | 6.3×5.3 6.3×7.7 | 75 98 | 6.3×7.7 8×6.5 | 98 105 | 6.3×7.7 8×10 | 75 190 | 10×10 | 200 |
| 68 | 680 | 5×5.3 | 58 | 5×5.3 6.3×5.3 | 58 89 | 5×5.3 6.3×5.3 | 58 89 | 6.3×5.3 | 89 | 6.3×7.7 | 109 | 6.3×7.7 | 109 | 8×10 | 190 | 10×10 | 226 |
| 100 | 101 | 5×5.3 6.3×5.3 | 58 89 | 6.3×5.3 | 89 | 6.3×5.3 6.3×7.7 | 89 109 | 6.3×5.3 6.3×7.7 8×6.5 | 89 109 125 | 6.3×7.7 | 109 145 | 8×10 | 252 | 8×10 | 190 | 10×10 | 226 |
| 150 | 151 | | | | | | | | | | | 10×7.7 | 252 | | | | |
| 220 | 221 | 6.3×5.3 6.3×7.7 | 89 124 | 6.3×5.3 6.3×7.7 | 89 124 | 6.3×7.7 8×6.5 8×10 | 124 175 270 | 6.3×7.7 8×10 | 124 270 | 8×10 10×7.7 | 270 270 | 8×10 10×10 | 270 370 | 10×10 | 320 | 12.5×13.5 | 500 |
| 330 | 331 | 6.3×7.7 | 124 | 6.3×7.7 8×6.5 | 124 190 | 8×10 | 290 | 8×10 10×7.7 | 290 290 | 10×10 | 400 | 10×10 | 400 | 12.5×13.5 | 600 | 12.5×16 | 600 |
| 470 | 471 | 8×10 | 290 | 8×10 | 290 | 10×7.7 10×10 | 290 400 | 10×10 | 400 | 10×10 | 400 | 12.5×13.5 | 680 | 12.5×16 | 740 | 16×16.5 | 850 |
| 680 | 681 | | | 10×7.7 | 290 | 10×10 | 410 | 10×10 | 410 | 12.5×13.5 | 680 | 12.5×13.5 | 680 | 16×16.5 | 1,000 | 18×16.5 | 1,100 |
| 1,000 | 102 | | | 10×10 | 430 | 10×10 | 430 | 12.5×13.5 | 750 | 12.5×13.5 | 750 | 16×16.5 | 1,100 | 18×16.5 16×21.5 | 1,350 1,400 | | |
| 2,200 | 222 | | | 12.5×13.5 | 890 | 12.5×13.5 | 890 | 16×16.5 | 1,100 | 16×16.5 | 1,100 | 18×16.5 16×21.5 | 1,450 1,500 | | | | |
| 3,300 | 332 | | | 12.5×16 | 1,000 | 16×16.5 | 1,300 | 16×16.5 | 1,300 | 18×16.5 16×21.5 | 1,450 1,500 | 18×21.5 | 1,750 | | | | |
| 4,700 | 472 | | | 16×16.5 | 1,400 | 16×16.5 | 1,400 | 18×16.5 16×21.5 | 1,600 1,650 | 18×21.5 | 1,750 | | | | | | |
| 6,800 | 682 | | | 18×16.5 16×21.5 | 1,700 1,750 | 18×16.5 16×21.5 | 1,700 1,750 | 18×21.5 | 2,000 | | | | | | | | |
| 10,000 | 103 | | | 18×21.5 | 2,000 | 18×21.5 | 2,000 | | | | | | | | | | |

| V. DC μF | Contents | 100V (2A) | | 160V (2C) | | 200V (2D) | | 250V (2E) | | 400V (2G) | | 450V (2W) | |
|-------------|----------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|-----------|-----|-----------|-----|
| | | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA | φ D×L | mA |
| 4.7 | 4R7 | | | | | | | | | 12.5×13.5 | 120 | 12.5×13.5 | 120 |
| 10 | 100 | 8×10 | 90 | | | | | 12.5×13.5 | 150 | 12.5×13.5 | 120 | 12.5×16 | 130 |
| 22 | 220 | 8×10 | 90 | | | 12.5×13.5 | 240 | 12.5×13.5 | 150 | 16×16.5 | 140 | 16×16.5 | 140 |
| 33 | 330 | 10×10 | 120 | 12.5×13.5 | 290 | 12.5×16 | 310 | 12.5×16 | 240 | 16×16.5 | 140 | 18×16.5 | 180 |
| 47 | 470 | 10×10 | 120 | 12.5×16 | 370 | 16×16.5 | 420 | 16×16.5 | 340 | 18×16.5 | 280 | 18×21.5 | 250 |
| 68 | 680 | 12.5×13.5 | 380 | 16×16.5 | 500 | 16×16.5 | 420 | 18×16.5 16×21.5 | 440 450 | 18×21.5 | 350 | | |
| 100 | 101 | 12.5×13.5 | 440 | 18×16.5 16×21.5 | 650 690 | 18×16.5 16×21.5 | 550 590 | 18×21.5 | 490 | | | | |
| 220 | 221 | 16×16.5 | 600 | | | | | | | | | | |
| 330 | 331 | 18×16.5 16×21.5 | 780 850 | | | | | | | | | | |

Part Numbering System

VE series 470μF ±20% 6.3V Carrier Tape 8 φ ×10L Pb-free and PET coating case

VE- **471** **M** **OJ** **TR** - **0810**

Series name Capacitance Capacitance Tolerance Rated Voltage Package Type Terminal Type Case size Lead Wire and Coating Type

Note: For more details, please refer to "Part Numbering System (SMD Type)" on page 12.

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